

Patent claims

1. A fiberscope comprising a body (10) and an  
5 insertion tube (21) belonging to a part (20) that  
is separable from the body (10), this body (10)  
and this separable part (20) being mechanically  
joined at a connection zone (12, 22), this  
fiberscope also comprising:
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- first guide means belonging to the body (10),  
in particular a first set of cables (42), that  
can be operated via a maneuvering element  
belonging to the body, in particular a handle;

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  - second guide means belonging to the separable  
part (20), in particular a second set of cables  
(52), that are able to move the insertion tube  
(21);

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  - first optical means (60) belonging to the body  
(10), and able to transmit light to the  
connection zone (12, 22) and return an image of  
this connection zone (12, 22) to a zone for  
25 viewing by a practitioner, such as an eyepiece;
  - second optical means (70, 72) belonging to the  
separable part (20) and able to transmit light  
from the connection zone (12, 22) to a distal  
end (21') of the insertion tube (21) and return  
30 an image from this distal end of the insertion  
tube (21) to the connection zone (12, 22), and
  - first (40) and second (50) mechanical  
35 connection and optical transmission elements  
which are joined removably in service, each  
element (40, 50) being integral with  
corresponding guide means (42, 52) in such a  
way that a movement imparted by the first guide

means (42) can be transmitted to the second guide means (52), these mechanical connection and optical transmission elements (40, 50) also being able to transmit light coming from the first optical means (60) to the second optical means (70, 72) and to return an image from the second optical means (70, 72) to the first optical means (60).

2. The fiberscope according to claim 1, characterized in that the connection zone (12, 22) defines a seat (30) having inner walls (12<sub>2</sub>, 22<sub>2</sub>) in the shape of a portion of a sphere, while at least one of the first (40) and second (50) mechanical connection and optical transmission elements has spherical outer walls (40<sub>1</sub>) with a diameter substantially equal to that of said inner walls, so as to allow three degrees of freedom in rotation, without any degree of freedom in translation, of these two elements relative to the walls of the seat (30).

3. The fiberscope according to claim 1, characterized in that the first (40) and second (50) mechanical connection and optical transmission elements are joined removably, in service, by being mutually fixed in a removable manner.

4. The fiberscope according to claims 2 and 3, characterized in that a first (40) mechanical connection and optical transmission element, provided with said outer spherical walls (40<sub>1</sub>), defines a groove (40<sub>5</sub>) for receiving, in a removable manner, a second (50) mechanical connection and optical transmission element, which is in particular a plane disk.

5. The fiberscope according to claim 4, characterized in that the first (40) mechanical connection and

optical transmission element has two parallel front faces (40<sub>2</sub>, 40<sub>3</sub>) and a protruding crown (40<sub>4</sub>) defining, with one (40<sub>3</sub>) of these front faces, said receiving groove (40<sub>5</sub>).

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6. The fiberscope according to claim 2, characterized in that the connection zone comprises two complementary, almost semicylindrical connection portions (12, 22) belonging respectively to the  
10 body (10) and to the separable part (20), in which connection portions corresponding recesses are formed which are intended to form said seat (30) in service.

15 7. The fiberscope according to claim 1, characterized in that the first and second mechanical connection and optical transmission elements are joined removably in service by being wedged relative to one another, in particular by being pressed flat  
20 against one another.

8. The fiberscope according to claim 1, characterized in that the first optical means (60) comprise a succession of lenses associated with a light  
25 source.

9. The fiberscope according to claim 1, characterized in that the second optical means comprise a central bundle (70) of optical fibers that are  
30 able to return an image from the distal end of the insertion tube (21) to the connection zone (12, 22), and also a peripheral bundle (72) of optical fibers that are able to transmit light from the connection zone (12, 22) to this distal end.

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10. The fiberscope according to claim 9, characterized in that the peripheral bundle (72) is surrounded by a sheath (74), in particular made of a metal or plastic material.

11. The fiberscope according to claim 9, characterized in that the central bundle (70) is made up of separate optical fibers.

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12. The fiberscope according to claim 9, characterized in that the central bundle is formed by different individual bundles of optical fibers of polyhedral shape which are disposed side by side one another.

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13. The fiberscope according to claim 1, characterized in that the connection zone (12, 22) is surrounded by an external locking means, in particular a ring (32).